MULTIPURPOSE SYSTEMS INFORMATION PACKET

Colorado Springs Fire Department

Division of the Fire Marshal

March 2013

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PURPOSE

This information packet has been developed in an effort to provide the highest level of service to the customers of the CSFD. The major goal of plan reviews conducted by the CSFD Construction Services is to ensure the design of multipurpose fire sprinkler systems meet the minimum requirements of the adopted codes and ordinances. To meet this goal, the submitted plans and supporting documentation must contain the information needed to conduct a thorough review.

SCOPE

This packet outlines the minimum requirements set forth in the International Fire Code, local amendments, and departmental policies and procedures as they relate to the installation of Multipurpose Fire Sprinkler Systems. This packet is not intended to provide an all-inclusive listing of submittal and inspections requirements, as it would be virtually impossible to cover all situations. This packet only covers requirements set forth in the latest edition of NFPA 13D and the adopted codes. Also included in this packet is information covering items required to be included on the working drawings and supporting documents.

Multipurpose fire sprinkler systems serve both domestic needs in excess of a single fixture and fire protection needs from one common piping system throughout the dwelling unit. Note that passive purge or flow-through systems does not qualify as a true multipurpose system and are beyond the scope of this document.

DEFINITIONS

CSFD	Colorado Springs Fire Department
CSU	Colorado Springs Utilities
Ft^2	Square feet
GPM	Gallons per Minute
IFC	International Fire Code
K-factor	Sprinkler head discharge coefficient
NFPA	National Fire Protection Association
NICET	National Institute for Certification in Engineering Technologies
PSI	Pounds force per square inch
RBD	Regional Building Department
SIN	Sprinkler Identification Number

GUIDELINES

I. INTRODUCTION.

A. APPLICABLE CODES AND STANDARDS.

1. Adopted International Fire Code and local Amendments.
2. Adopted International Plumbing Code and local Amendments.
3. Adopted International Residential Code and local Amendments.
4. 2013 Edition of NFPA 13D Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.
5. 2013 Edition of NFPA 72 National Fire Alarm Code.
6. Colorado Springs City Ordinances.
7. CSFD Administrative Rulings/Interpretations.

B. ADMINISTRATIVE REQUIREMENTS.

1. **Approved Contractors**. All multipurpose contractors must obtain a Colorado Springs Fire Suppression Contractor's M License in order to install, add to, alter, service, repair, test, maintain and inspect multipurpose fire sprinkler systems, in accordance with Pikes Peak Regional Building Code, Section 207. Please reference our Contractor Licensing Application Guide for details or contact Regional Building Department, Contractor Licensing at 719-327-2884 for additional information. The manufacturers are not required to be licensed.

2. **Approved Installers**. A Colorado Springs licensed Installer-Limited shall be on-site for all installations, additions, alterations, repair and inspections of multipurpose sprinkler systems. Installers are required to pass a test administered by Compliance Services and Assessments and obtain approval from the CSFD prior to overseeing any work on any multipurpose system.

3. **Code/Standard Editions**. Multipurpose fire sprinkler systems shall meet the criteria of the adopted IFC and Plumbing Code as amended and all applicable requirements of the most recent edition of the NFPA standards. NFPA standards are effective on the January 1st of the year following the effective date printed in the standard. Sprinkler systems shall also meet the requirements set forth in adopted ordinances and CSFD Administrative Rulings.

4. **Permits/Inspections**. Required plan submittal with approvals, permits and associated inspections must be secured through CSFD Construction Services as well as Pikes Peak Regional Building Department. Plan approval and permits shall be secured prior to the start of any work.

5. **Alternative Methods**. If special building conditions and/or restrictions exist that may prohibit any of the requirements set forth in adopted codes, rules, regulations, etc. from being met, approval by CSFD Construction Services for an alternate installation will be

required. This alternate method must be approved before any installation of the system begins. In some cases, the alternative method may be referred to the Fire Board of Appeals for consideration.

6. **Non-Required Systems.** All non-required fire sprinkler systems shall meet the requirements of adopted codes and standards. Additionally, they shall be submitted for review and approval to CSFD Construction Services.

7. **Revisions.** After initial approval, all revisions shall be clouded and identified with a sequential numbering or lettering system, such as Revision A, B, etc or Revision 1, 2, etc. Revisions are date sensitive, thus each revised sheet must bear the date of the revision.

II. SUBMITTAL INFORMATION.

Submittals shall be of sufficient clarity and quality to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of the IFC, and other relevant laws, ordinances, rules and regulations adopted by Colorado Springs, and as determined by the Fire Code Official. You may refer to the attachments section of this packet for a more complete checklist of items required to be provided on the submitted plans. This documentation is required to assure the plan submittal package contains the necessary information for a complete plan review.

A. MINIMUM REQUIREMENTS OF THE CSFD FOR SUBMITTAL.

1. **Drawing Size**. Drawings shall be submitted on sheets no less than 24x36 inches and shall be drawn to ⅛" or ¼" scale. Other scales may be accepted on an as-needed basis, please contact the CSFD Construction Services if you have questions regarding the use of different scales.

2. **Plan Review Number**. Drawings shall be provided with **CSFD Plan Review Number**. This number is an eight digit numeric code located in the blue stamp on the back of the Architectural/building permit set of plans.

3. **Number of Drawing Sets**. A minimum of 2 sets of drawings are required to be submitted to Construction Services and shall include the items found in the checklist provided within this packet. Please roll plans, as this method is more appropriate for our plan bins and easier to transport within the office. A maximum of three original sets may be stamped with our approval. Refer to the Attachments for the checklist of information required on all plans submitted. All plan sheets shall be signed/sealed by a NICET level III/IV or a Colorado registered Professional Engineer, employed by the manufacturer of the system being used.

4. **Cut Sheets/Specifications**. One set of manufacturer's product information (cut sheets) shall be provided. This is to include information on all devices that are part of or being connected to, the multipurpose system. It is not necessary to include cut sheets for plumbing fixtures such as sinks, toilets, etc unless specifically requested by CSFD. When cut sheets show multiple models/types of devices, the specific item(s) being installed shall be highlighted. For example, in using extended coverage heads, the spacing utilized in the design and calculations shall be highlighted on the cut sheets as well as indicated on the drawings.

A table of contents shall be provided and specifications package shall be tabbed with the following sections: Water supply, Sprinklers, Piping and Fittings, Valves, Hangers, appurtenances and other system components, Operating instructions for the entire system, and Manufacturer approved testing instructions.

Cut sheets shall be rolled inside the plans to prevent them from becoming separated. Stamped cut sheets will be returned to the contractor and must remain on the job site with the approved plans. The cover of the cut sheets shall be signed/sealed by a NICET level III/IV or a Colorado registered Professional Engineer, employed by the manufacturer of the system being used.

CSFD accepts cut sheets on CD. The CD must have the individual cut sheets for the materials specific to the job – we will not accept manufacturer's CD's! If this option is chosen, the CSFD will stamp, date and initial the CD – it is then the contractor's responsibility to provide the means of reviewing that disk upon the fire inspector's request.

5. **Hydraulic Calculations**. A minimum of 2 sets of hydraulic calculations are required to be submitted to Construction Services and shall include the items found in the checklist provided with this packet. Calculations shall be rolled inside the plans to prevent them from becoming separated. One set will be retained by Construction Services for our records. The cover page of all hydraulic calculations shall be signed/sealed by a NICET level III/IV or a Colorado registered Professional Engineer, employed by the manufacturer of the system being used.

B. CONSTRUCTION DOCUMENTS.

Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of the IFC, and relevant laws, ordinances, rules and regulations as determined by the CSFD.

Plans shall be legible, dark-lined and reproducible with conventional copying equipment. Please do not use colored highlighting as these are frequently not reproducible. Also do not use colored or gray background shading as these interfere with scanning.

Be sure to include information regarding beams (width/depth), whether structural or decorative, ceiling fans, light fixtures, ceiling heights especially when there are ceiling pockets or coffered ceilings.

Refer to the attachments within this packet for a checklist of items to be included on your drawings.

II. GENERAL INFORMATION AND REQUIREMENTS.

Multipurpose fire sprinkler systems serve both domestic needs in excess of a single fixture and fire protection needs from one common piping system throughout the dwelling unit. Note that passive purge or flow-through systems does not qualify as a true multipurpose system and are beyond the scope of this document

A. MONITORING.

Local water flow alarms shall be installed on all sprinkler systems in homes not equipped with smoke alarms or smoke detectors in accordance with NFPA 72. It is not the intent of NFPA 13D to require supervising station monitoring for these systems.

B. WATER SUPPLY INFORMATION.

Theoretical water supply information shall be obtained from Colorado Springs Utilities. Construction Services will not accept actual flow tests for fire sprinkler plan submittal and hydraulic calculations! The information on this report shall be less than 1 year old. A copy of this report shall be provided with your submittal package.

On the water supply graph, a curve showing the PRV controlled water supply shall be provided. This is the information that must be used in the design of the multipurpose fire sprinkler system.

The required sprinkler system flow and pressure shall fall on or under this curve.

C. ADDITIONAL REQUIREMENTS.

1. **Plastic Pipe and Spray Foam Insulation.** Compatibility shall be verified and proof of application in accordance with manufacturer requirements shall be provided. In general, it is best to avoid using spray foam insulation with plastic piping due to the exothermic reaction of the spray foam during the curing process.

2. **Freezing Conditions.** Here in Colorado, we experience sub-zero temperatures and the resultant sprinkler system freezes.

   Water pipes shall not be installed outside of a building, in attics or crawlspaces, concealed in outside walls, or in any other place subjected to freezing temperature unless adequate provision is made to protect such pipes from freezing by insulation or heat or both. No insulation may be placed between the sprinkler piping and the heated/conditioned space.

3. **Passive Purge Systems**. Passive purge or flow-through systems where a connection is made to only one domestic fixture does not qualify as a true multipurpose system. Backflow prevention is not required since all the materials are still required to meet potable water requirements.

4. **Warning Sign**. A warning sign, with minimum ¼ inch letter shall be affixed to the main shutoff valve and shall state the following:

   > **WARNING:** The water system for this home supplies fire sprinklers that required certain flows and pressure to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system such as water softeners, filtration systems and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign.

IV. INSTALLATION.

A. CONSTRUCTION PERMITS

1. A construction permit is required for installation of or modification to a multipurpose sprinkler system. Any modification requires a permit. Maintenance is defined as the work necessary to keep equipment operable or to make repairs. An example of maintenance work would be exercising valves, lubing stems or cleaning strainers. Replacing existing sprinklers due to age, paint or damage would be considered repair work and not subject to permit requirements.

2. The installation of the multipurpose sprinkler system is not to commence, including any pre-piping, until the working plans have been reviewed and approved by CSFD Construction Services and a construction permit is secured on site. To begin work prior to plan approval, contact the CSFD Construction Services office for further information. Plumbing to and installation of domestic piping and/or fixtures is not regulated by CSFD.

3. Permits for multipurpose sprinkler systems expire one year after date of issue. A 30-day grace period is allowed to renew the permit. After the grace period expires, if inspections have been conducted in the past 13 months, new plans and permit is not required to be submitted. If the grace period has expired and no inspections have occurred in the past 13 months, new plans shall be submitted.

B. APPROVED CONTRACTORS/INSTALLERS.

1. A Colorado Springs Licensed Installer-Limited shall be on-site for all installations, additions, alterations, repairs and inspections of multipurpose sprinkler systems. The Installer shall be employed by a Fire Suppression Contractor M licensed company in accordance with Pikes Peak Regional Building Code, Section 207.

V. INSPECTIONS AND TESTING.

It shall be the duty of the person doing the work authorized by a permit to notify the CSFD and RBD that the work is ready for inspection. It shall also be the responsibility of the person requesting the inspections to provide access to and means for proper inspection of the work.

Don't put the inspectors on the spot. Call before they walk on the site with any questions and get them resolved up front with all parties involved. Additionally, if you want them to be consistent, compliance with the minimum codes is a must.

Systems shall undergo an acceptance test witnessed by CSFD. It shall be unlawful to occupy any portion of a building or structure until the required systems have been tested and approved by the CSFD.

A. ABOVEGROUND PIPING.

1. **Visual Inspection.** Sprinkler locations will be visually inspected and approved to ensure installation is per approved plans and any deviations do not exceed listing limitations. Piping and supports shall be in accordance with the locally adopted plumbing code and will be verified by the plumbing inspector.

2. **Hydrostatic Test**. The systems shall be hydrostatically tested at normal system operating pressure, in accordance with the locally adopted plumbing code. The hydrostatic test may be conducted using sprinklers or plugs installed in the fittings. If

plugs are used, additional testing is not required. Hydrostatic testing will be verified by the plumbing inspector.

3. **System Operational Tests.**

   Bucket Test. All systems designed and installed in accordance to NFPA 13D shall undergo a bucket test which will be witnessed by the fire inspector. Water will be flowed from the remote sprinklers into calibrated buckets for a minimum one minute. Pressures and flow will be recorded during this time. Buckets shall be calibrated in 1-gallon increments.

B. UNDERGROUND PIPING.

CSFD does not perform inspections of the underground service lines; CSU Service Line Inspections will inspect the service line and approve the burial.

C. COMPLETION DOCUMENTS.

1. An owner's manual and installation instructions covering the multipurpose sprinkler system equipment. This information is to include instruction on inspector, testing and maintaining the system.
2. A copy of the completed *Fire Sprinkler System Installer's Certification*.
3. Permanent records such as hydraulic nameplate and general information in shall be provided.

REFERENCES AND LINKS

a. Colorado Division of Fire Safety Web site.
   http://dfs.state.co.us/

b. CSU Water & Wastewater specifications.
   http://www.csu.org/

c. Administrative Rulings and IFC Amendments can be found on the CSFD web site at
   http://www.springsgov.com/Page.aspx?NavID=1093

ATTACHMENTS

Working Drawing Submittal Checklist

Hydraulic Calculations Checklist

Permit Application

Plan Requirements per NFPA 13 and CSFD.

Working Drawings

Title Block shall contain the following:

- ❑ Name of owner and occupant.
- ❑ Location including full street address as assigned by RBD Enumerations.
- ❑ Name, address, phone, FAX number and email address of installing contractor and designer.
- ❑ Signature/seal by a person holding a NICET level III or IV certification in Sprinkler Systems or State of Colorado Professional Engineering license, employed by the manufacturer of the system used.
- ❑ CSFD Plan Review number
- ❑ Point of Compass on every page.
- ❑ A scale including graphic representation.
- ❑ Detailed scope of work.

Information required on Drawings:

Building Information:

- ❑ Construction type.
- ❑ Full height scaled elevations and cross sections of the building. Be sure to include structural information and ceiling construction for clarity. Section cut lines shall be indicated.
- ❑ Location of partitions, fire walls and /or area separation walls and rating classifications.
- ❑ Location of full-height walls.
- ❑ Location of concealed spaces, closets, attics and bathroom including dimensions.
- ❑ Location areas where sprinklers have been intentionally omitted. Must also note with a code reference why sprinklers were omitted from these areas.
- ❑ A copy of the RBD approved plumbing plan shall be submitted with your fire sprinkler plans.

Site Plan Information:

- ❑ Size of city main(s), circulating or dead end and if dead end, the distance to the nearest circulating main.
- ❑ City main theoretical flow test results from CSU.
- ❑ Underground pipe size, length, location, material and point of connection to city main.

System Information:

- Sprinkler Legend to include: Make, type, temperature rating, K-factor, SIN and nominal orifice size of sprinklers. Sprinkler head spacing dimensions and the listed spacing used for special sprinklers.
- Piping Legend to include: Pipe type and schedule of wall thickness, actual internal diameter.
- Temperature rating and location of high temperature heads.
- Area protected by each system on each floor and total area being protected.
- Number of sprinklers on each riser per floor and total number of sprinklers per building.
- Complete riser manifold detail.
- Information about backflow preventers (manufacturer, size, type) if provided, and meters.
- Location and type (wet/dry, automatic/manual) of standpipe risers, outlets/valves and related equipment.
- Location and details of all control valves, check valves, drain pipes and test connections.
- Size, type and setting for Pressure-reducing valves.
- Nominal pipe size and cutting lengths of pipe (center-to-center dimensions).
- Type of fittings, location and size of riser nipples, size of welds and bends.
- Type and location of hangers, inserts and sleeves.
- Hydraulic reference corresponding with comparable reference points on the hydraulic calculation sheets.
- System design criteria showing **minimum** density and the design area. Also indicate the **total** water and pressure required.
- For hydraulically designed systems, the information on the hydraulic data nameplate attached to the riser.
- Relative elevation of sprinklers, junction points and supply or reference points.
- System elevation relative to grade and other sprinkler heads, junction points and supply or reference points.
- Edition year of NFPA 13D that the system was designed to.

Information Required on Hydraulic Calculations.

Summary Sheet.

- Date, location, name of occupant, owner and building number or other pertinent identification.
- Name, address and phone number of installing contractor and designer.
- Description of hazard classification.
- Specific NFPA reference material for design density used in calculations.
- Total water requirements for the system as calculated, at the base of the riser, defined by CSFD as being the Supply Side Pressure Gau*ge.*

System design requirements.

- Design area in number of heads.

- Minimum density in gpm/ ft^2.
- Area of coverage per sprinkler in ft^2 specify if you are using actual or maximum protection area.
- Spacing of sprinkler heads. When using special sprinklers, be sure to also indicate the manufacturer's minimum flow and pressure requirements, or any other unusual requirements.

Detailed Worksheets – actual calculations.

- Sprinkler description and K-factor.
- Hydraulic coefficient used in calculations (C-factor).
- For gridded or looped systems, a sketch representing the flow quantities and direction for lines with sprinklers operating in the hydraulically most remote area.
- Page numbers on every page.
- Pipe size (actual internal).
- Pipe lengths (center-to-center of fittings).
- Equivalent pipe lengths for all fittings and devices used in calculations.
- Friction loss in psi per foot of pipe.
- Total friction loss between reference points.
- Elevation head in psi at each reference point.
- Velocity pressure and normal pressure if included in calculations.
- Nodes to indicate hydraulic reference points, reference to other sheets, or to clarify data shown.
- Flow in gpm.
- Required pressure in psi at each reference point.
- Combined K-factor calculations for sprinklers on drops, armovers, or sprigs where calculations do not begin at the sprinkler

Water Supply Summary.

- Location and elevation of static and residual test hydrants with relation to the riser reference point.
- Static pressure in psi.
- Residual pressure in psi.
- Resulting flow in gpm. A theoretical flow model must be obtained from Colorado Springs Utilities.
- Graphic representation showing the water supply curve and system requirements plotted on semiexponential graph paper (also known as N1.85 or hydraulic paper) so as to present a graphic summary of the complete hydraulic calculation. This graph shall include the following:
  - Water Supply and PRV controlled supply curves.
  - Sprinkler system demand.

Division of the Fire Marshal
Construction Services

Multipurpose Sprinkler System Permit Application

This form must be completed and attached to the front of plans

☐ Initial Review ☐ Re-Review ☐ 3rd Party Review

Company Name: _____

Project Name: _____

Project Address: _____

Contact Person: _____

Company Phone: _____ Fax Number: _____

E-mail Address: _____

System Information:

Type of Work: ☐ New ☐ Addition ☐ Remodel

Type of System: ☐ Multi-purpose ☐ Passive Purge

Manufacturer: _____

Information to be provided on the plans:

☐ CSFD Plan Review Number
☐ Project address
☐ Installer Address
☐ Equipment Data Sheets
☐ Device Legend
☐ Narrative Scope of Work
☐ Plans, Calculations, Cut Sheets signed sealed
☐ Project is within the City of Colorado Springs Fire Jurisdiction

I attest the above information is provided and accurate and that my license is in good standing with Pikes Peak Regional Building Department; I understand my plans will not be reviewed if any of the items were not provided.

Signature:_____Print Name: _____

THIS PLAN IS READY FOR PICK-UP

☐ APPROVED/APPROVED AS CORRECTED
☐ DISAPPROVED/WITHDRAWN

☐ FEES DUE: _____

- Reviewer: ☐ Withee ☐ Embres ☐ Hanenberg

Comments:_____

Please pickup and review plans prior to calling our office regarding plan review comments.

Plan Review Status/Comments available online at: www.SpringsGov.com

Follow Links "Departments-Fire-Fire Code Enforcement- Review Plan Status"

All plans remaining in our office more than 30 days will be discarded as abandoned.